

Different genes may cause autism in boys and girls

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Like detectives trying to solve a murder case, researchers searching for the biological cause of autism have come up with some surprising suspects. They've found that different genes may be responsible for causing autism in boys than in girls.

In addition, the researchers also have discovered that other genes may play a role in the early onset form of the developmental disorder and in the recently verified regression, or late onset, type of autism, according to a new study published today in the online edition of the journal *Molecular Genetics*.

The study also provides new evidence for the idea that multiple genes contribute to autism, said lead author Gerard Schellenberg, a researcher at the Puget Sound Veterans Affairs Medical Center and a research professor of medicine at the University of Washington. The research team was headed by Schellenberg, Ellen Wijsman, a UW research professor of medical genetics and Geraldine Dawson, director of the UW's Autism Center.

"It is highly unlikely that there is only one gene responsible for autism," said Schellenberg. "There may be four to six major genes and 20 to 30 others that might contribute to autism to a lesser degree.

"If an individual only gets three high-risk variants of these genes, it could mean a less-severe form of autism. And because autism is rarer in females, it may take more risk genes for a female to have autism. There

also is the possibility that there might be a biological difference in autism for females versus males," he said.

"What is meaningful is that we have found evidence for two genetic subtypes of autism, male versus female and early versus late onset," added Geraldine Dawson, a professor of psychology. "This is a critical piece of information. With Alzheimer's disease research, one big breakthrough was segregating the late and early onset forms of the disease, and this led to important genetic discoveries."

Schellenberg said the study came up with "strong support" for an autism gene on chromosome 7 and "less, but still compelling evidence" for genes on chromosomes 3, 4 and 11. These results confirm some data from previous studies, particularly involving chromosome 7.

The search for autism genes is part of a long-term Autism Center effort to uncover the genetic and neurobiological causes of autism. To find regions of the human genome that contain autism genes, the researchers scanned the DNA of 169 families that had at least two siblings who met the strict criteria for autism. They also scanned the DNA of another 54 families that, in addition to having individuals with strictly defined autism, also included members who had less severe forms of the disorder, such as Asperger syndrome.

"We have been working almost 10 years to get to this point," said Schellenberg. "If we can find and confirm that a particular gene is involved in autism the field will explode. We have to find a gene so that molecular biology can be defined and we can understand what's inside autism. Until that happens, we are dancing on the outside."

Dawson said the researchers are looking for autism susceptibility genes, ones that heighten the risk of an individual getting autism, just as there are genes that raise the chances of getting breast cancer.

"Once we discover these susceptibility genes, we can immediately screen infants to identify those at risk early in life. Early identification can lead to early intervention, which could have a much more dramatic effect.

"Also, when a gene is discovered, you discover the underlying biology of autism at the molecular level. Once you understand the biology you can develop a prevention strategy including medical approaches. Genetic research is a good strategy for eventually designing effective medical treatments for autism," she said.

Source: University of Washington

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